An Observational Study to Describe the Clinical Pattern of Dermatological Emergencies from Emergency Department and Intensive Care Unit: Our Experience from a Tertiary Care Hospital in Northern India

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Abstract

Background: A large number of skin diseases have the potential to culminate into potentially fatal "acute skin failure." The concept of dermatological intensive care unit (ICU) has largely evolved as a result of increased number of emergencies encountered by dermatologists these days. Dermatological emergencies comprise 8–20% of cases presenting to the emergency department. A wide variety of these conditions require a collective effort by intensivists, surgeons, physicians, and nursing staff in association with the treating dermatologist to reduce the associated mortality and morbidity. Dermatology ICU along with state-of-the-art nursing care is required to manage these cases, which result in acute skin failure. **Materials and Methods:** A prospective study conducted in a tertiary care center with a round the clock emergency department and a state-of-the-art dermatology ICU over a period of 12 months. Patients requiring primary dermatological consultation in the emergency department and patients admitted in the dermatology intensive care unit were evaluated, and their clinical variables were statistically analyzed. **Results:** In total, 327 cases were seen in the emergency department, out of which 54 (16.5%) cases were admitted in dermatology ICU, 239 (73.1%) were treated as outpatient cases, and 34 (10.4%) were managed as inpatients in other wards of the hospital. The most common condition in out-patient cases was acute urticaria and angioedema in 71 (29.7%), while vesiculobullous disorders in 16 (29.6%) patients was the most common condition requiring admission in dermatology ICU. **Conclusions:** At present, only few studies are available in the literature on the spectrum of dermatological disorders reporting to emergency department, and further requiring intensive care under ICU setting. This prospective study highlights the varied patterns of dermatosis reporting to emergency outpatient department and those managed in the ICU.

Keywords: *Acute skin failure, dermatology ICU, emergency*

Introduction

Dermatological diseases accounts for 8%–20% of the patients visiting emergency outpatient department globally.[1,2] In view of increased longevity resulting in an immunosuppressed state, availability of organ transplant, use of multiple drugs, malignancies, and indiscriminate use of drugs including homeopathic and ayurvedic, the possibility of a patient culminating into acute failure of skin has increased. Patients with acute skin failure present unique challenges as the anatomical and physiological function of the skin is completely compromised resulting in an inability to maintain a core body temperature, failure to prevent percutaneous loss of fluids, electrolytes, and proteins resulting in imbalance and failure of the mechanical barrier to prevent invasion of foreign material.[3] This establishes the requirement of a dedicated intensive care unit (ICU) in dermatology specifically designed for dermatological emergencies. A dermatological emergency is defined as a cutaneous condition, which requires early and prompt diagnosis, continuous monitoring, hospitalization, and intensive care to minimize associated mortality and morbidity.[4]

Dermatological emergencies are primarily divided into primary cutaneous emergency, where skin is the primary target, and secondary cutaneous emergency, where skin is affected secondary to a systemic medical or surgical involvement. In both the cases, however, acute skin failure is the end result

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that lands the patient in the emergency department. Acute skin failure is the most common dermatological emergency, which requires a multidisciplinary, intensive care approach because of the high chances of progression into mortality and morbidity.[5,6]

A wide spectrum of dermatosis can result into dermatological emergencies such as angioedema, acute urticaria, immunobullous diseases, erythroderma, drug reactions such as Stevens–Johnson syndrome (SJS), toxic epidermal necrolysis (TEN), and lymphomas.[5] Most of these conditions are life threatening and fulfill the definition of an emergency, i.e., "a risk perceived by a doctor or a patient to life, limb or the structure/function of an important organ of the body."[7] The concept of an ICU in dermatology setting was first introduced in 1974 by Prof. Rene Touraine. He advocated that patients with various skin conditions landing into acute skin failure leading to multiorgan involvement requires specialized intensive management by dermatologist in collaboration with an intensivist.[8]

This study was aimed to study the varied presentation of dermatological emergencies at the emergency department of a tertiary care hospital, with emphasis on the spectrum of cases managed in the dermatological ICU.

Materials and Methods

The study was conducted in a tertiary care hospital in New Delhi, India, over a period of 1 year from November 01, 2016 to October 31, 2017. Dermatological emergencies were selected from Emergency OPD, which is attended by all specialty emergencies centrally. All patients presenting with primary skin conditions to the emergency department or admitted to the dermatology intensive care unit were included. Patients presenting with a primary nondermatological condition and who were referred from other departments for dermatology consultation in emergency OPD of the hospital were excluded from the study.

The study was conducted in a time-bound manner after obtaining written informed consent from patients/relatives. Permission of institutional ethics committee was taken. All patients with dermatological emergencies presenting to the emergency OPD were screened and included in the study. Patients were categorized as having a primary dermatological condition or a secondary cutaneous emergency. Patients admitted to the ICU, either from the casualty or the outpatient department, were also examined. Emergencies due to bites without any skin manifestations, burns, or skin loss due to trauma were not included in the study as they were not primarily managed by dermatologists. The clinical variables in admitted and nonadmitted patients over a period of 1 year were recorded and statistically analyzed using two-tailed Fisher's exact test.

Results

In total, 327 cases with primary dermatological conditions out of a total of 35,546 patients (0.92% of total emergency department consultations) presenting to the emergency department during the study period were screened. Of these, 177 (54%) were males and 150 (46%) were females. The age of the patients ranged from neonate to 88 years, with the average age being 40.6 years.

Of these, 88 (26.9%) were admitted and 239 (73.1%) were treated in the emergency department on an outpatient basis. Among the nonadmitted patients, the most common dermatological condition encountered in the emergency department was acute urticaria and angioedema (29.7%), followed by viral exanthem (25.9%), which included varicella, measles, herpes zoster, and other seasonal viral exanthems, and drug rash (15.9%), which involved minimal body surface area (BSA). Eczemas constituted 8.4% which included allergic and irritant contact dermatitis among the most common ones and bacterial skin infections made up to 3.3% of the referrals. Less common causes included scabies, oral stomatitis, papular urticaria, and extensive fungal infections [Table 1].

Among the 88 patients who required inpatient care, 54 (61.3%) were managed in the dermatology ICU. The decision to manage a patient in a specialized ICU setting was based primarily on the diagnosis of acute skin failure and the current patient condition, as well as overall severity of the involvement.

The most common cause for admission in ICU was vesiculobullous disorders (29.6%), [Figure 1] followed by cases of erythroderma (24.1%). Other conditions included severe drug reactions (11.1%), infectious dermatoses (9.3%), and cutaneous vasculitis (3.7%) [Table 2]. Neonatal emergencies, pustular psoriasis, and lepra reactions constituted the miscellaneous group. Pemphigus group of diseases accounted for the majority of vesiculobullous disorders. Erythroderma was noted mainly secondary to psoriasis vulgaris or airborne contact dermatitis. Drug reactions were common due to antiretrovirals in 15 (27.7%) [Figure 2], anticonvulsants in 11 (20.3%), antitubercular drugs in 7 (12.9%), and Dapsone in 5 (9.2%) cases [Table 3]. Staphylococcal scalded skin

Table 1: Patients managed on outpatient basis

Diagnosis	Number of patients	Percentage (*n*=239)
Urticaria/angioedema	71	29.7
Viral exanthema	62	25.9
Varicella	29	
Measles	22	
Others	11	
Drug rash	38	15.9
Eczema	20	8.4
Bacterial skin infections	8	3.3
Others	40	16.7

Figure 1: A case of pemphigus in acute skin failure with extensive body surface area involvement managed with rituximab and intravenous immunoglobulin

Figure 2: A case of toxic epidermal necrolysis due to nevirapine managed with cyclosporine

syndrome and Kaposis's varicelliform eruptions were the causes of infectious dermatoses. Eight patients among the total admitted had an underlying retroviral infection. Two patients had immune suppression due to organ transplantation.

The dermatology ICU had two beds with reverse barrier nursing facility and one separate isolation bed for contagious diseases. The center was manned round the clock by a dedicated team of dermatologists, anesthesiologists, and nursing attendants along with an intern on rotation. Support from other concerned departments was available on call.

Table 2: Dermatological emergencies managed in dermatological intensive care unit

Diagnosis	Number of patients	Percentage (*n*=54)
Vesiculobullous diseases	16	29.6
Erythroderma	13	24.1
Severe drug reactions	6	11.1
Infectious dermatoses	5	9.3
Cutaneous vasculitis	2	3.7
Others	7	12.9

Table 3: Common drugs incriminated in drug rash

Drug incriminated	Number of patients	Percentage (*n*=54)
Anti-retro viral drugs	15	27.7
Anti-convulsants	11	20.3
Anti-tubercular drugs	7	12.9
Dapsone	5	9.2

Out of the 54 patients admitted in dermatology ICU, 33 patients (61.1%) were females and 21 patients (38.9%) were males. The youngest patient was a 3-year-old with staphylococcal scalded skin syndrome and the oldest patient

who had erythroderma following psoriasis vulgaris was 89 year old [Figure 3]. The average age of the admitted patients was 54.2 years. Majority of the patients were in the extremes of age, which required special considerations due to multiple comorbidities and drug interactions.

Discussion

A number of dermatosis are potentially life threatening and poses a variety of management challenges. A wide array of skin diseases like drug reaction, SJS-TEN, drug rash, vesiculobullous disorders, angioedema/urticaria, toxic shock syndrome, necrotizing fasciitis, meningococcemia, and cutaneous malignancies often present in emergency department and require observation in a specialized care under controlled environment. Present-day dermatologists are encountered with multiple challenges such as HIV coinfection, elderly patients with associated comorbidities, immunosuppressive drugs, alternative medications available that claims miraculous results, and availability of organ transplant, among dermatology patients reporting in emergency. It adds to the new set of challenges in their clinical assessment and management.

Although relatively less studied, acute skin failure is an emergency as patients are prone to rapid clinical deterioration and require prompt specialized intensive care management.[9] Prompt and appropriate initiation of treatment on the lines of burns patient and excellent reverse barrier nursing care are the twin principles of management that can save many lives. Management in dermatological ICU set up is beneficial through team effort that requires support of other health professionals and state-of-the-art nursing facilities as well.

Figure 3: A case of erythroderma secondary to psoriasis vulgaris managed with biologics

In total, 26.9% of dermatology emergency calls required inpatient care in our study, which is consistent with the findings of other studies mentioned in literature.[10] The most common cause of admission in dermatology ICU was vesiculobullous disease in the present study. These patients had a positive Nikolsky sign and were managed under strict aseptic conditions with immune-suppressants. However, erythroderma was the commonest diagnosis as per the study conducted by Samudrala *et al.*[10] Jack *et al.* found Stevens–Jonson syndrome as the most common cause of admission in ICU among dermatology patients.[11] Vesiculobullous diseases are known to vary depending upon the geographical region, which might be the reason of increased number of these cases requiring emergency consult in our study. Reactions and infections were the most common presentation among patients who reported to emergency OPD and treated on outpatient basis in a study by Gupta *et al.*, whereas we found urticaria and angioedema as the most common presentation in emergency patients treated on an outpatient basis.[12] The drugs most commonly associated with drug rash were antiretroviral drugs in 15 (27.7%) cases, whereas Pudukadan *et al.* incriminated co-trimoxazole as the most common cause of drug rash.[13]

Dermatological emergencies that alter the basic anatomical and physiological functions of skin eventually lead to multiorgan failure with effects the heart, lungs, and kidney. Here lies the importance of a multispecialty approach in managing such patients. Loss of stratum corneum leads to loss of the barrier function of the skin and up to 40 times increase in fluid loss. About 50% BSA involvement leads to a daily fluid loss of up to 4–5 L. Infection prevention is the key for a successful outcome and a reverse barrier nursing technique has been advocated for this.[7] Loss of proteins and electrolytes in the bullous fluid causes reduction in the intravascular volume. This subsequently leads to increase in blood nitrogen and a reduced urine output, which if not treated promptly would finally lead to renal failure. Loss of barrier function makes the patient prone to systemic infections leading to sepsis and shock. Impaired thermoregulation and a hypercatabolic state require continuous monitoring of vital parameters and maintaining an average room temperature of around 28°C –32°C. Increased cutaneous blood flow can increase the cardiac output to two times its normal value and can lead to a cardiac failure. Inhibition of insulin secretion and insulin resistance finally leads to hyperglycemia. Extremes of age and comorbidities further complicate the situation due to limited body reserves and polypharmacy. Morbidity and mortality due to dermatological emergencies are related to the age of the patient, BSA involvement, severity, and preparedness to deal with the condition. Sudden severe alterations in the physiology and anatomy of skin involving the entire skin surface presenting as an emergency situation can lead to disabling complications eventuating in the potentially fatal condition of acute skin failure.

Although ICU admissions due to dermatological emergencies are comparatively low, mortality associated with them is comparable to other medical and surgical emergencies like pneumonia and pancreatitis.[14] Dermatology patients with infective conditions and acute skin failure have longer intensive care and hospital stay as compared with the average adult intensive care population admitted with other conditions. The fact that the mortality and hospital stay is higher in patients admitted for dermatological emergencies highlights the importance of a closely monitored multidisciplinary approach to manage these patients under ideal environment as provided by an ICU.[15]

With the advent of effective drugs, state-of-the-art nursing care, monitoring facilities, and awareness of the need for immediate care, there has been a significant decline in the mortality rate associated with dermatological emergencies. Understanding the etiopathogenesis of various systemic complications of acute skin failure and their prompt management in a specialized dermatology ICU on lines similar to that of burns can save many lives.

Our center had the facilities of a fully functional dermatology ICU with facilities for optimal temperature setting as well as cardiorespiratory support and intensive management for any dermatological emergencies. A state-of-the-art dermatology ICU with multispecialty backup is necessary in managing dermatological emergencies with acute skin failure.

Conclusion

Dermatological emergencies requiring specialized environment for their management are on rise due to increased number of patients on immuno-suppresents and increased longevity world-over. At present the pattern of these emergencies is under reported from our country. We recommend the establishment of specialized dermatology ICU for management of these cases and to promote its use among dermatologists.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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